IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In Re Application of:)
)

John W. Maly et al.   )
) Examiner: Guerrier Merant

Attorney Docket 200207608-1   )
) Group Art Unit: 2117

Serial No. 10/712,902   )
) Confirmation No. 9445

Filing Date: November 12, 2003)
)

For: EXPECTATION BASED   )
     EVENT VERIFICATION   )

APPEAL BRIEF

To: Mail Stop Appeal Brief - Patents
     Commissioner for Patents
     P.O. Box 1450
     Alexandria, VA 22313-1450

Sir:

     The Appellants herewith respectfully submit the following appeal brief.

Appl. No. 10/712,902

This brief contains items under the following headings as required by 37 CFR §41.37 and MPEP §1206:

1. Real Party In Interest
2. Related Appeals, Interferences and Judicial Proceedings
3. Status of Claims
4. Status of Amendments
5. Summary of Claimed Subject Matter
6. Grounds of Rejection to be Reviewed on Appeal
7. Argument

Appendix A   Claims
Appendix B   Evidence
Appendix C   Related Proceedings

1. REAL PARTY IN INTEREST

The real party in interest in the above-referenced patent application is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

2. RELATED APPEALS AND INTERFERENCES

Appellants and the undersigned attorney are not aware of any other appeals or interferences which will directly affect or be directly affected by or having a bearing on the Board's decision in the pending appeal.

3. STATUS OF CLAIMS

Claims 1-4 and 6-22 are currently pending in the present application. The Appellants are appealing the rejections of claims 1-4 and 6-22. See, Claims Appendix.

Claims 1-4 and 6-22 have been rejected under 35 U.S.C. 102(b) as being anticipated by Goto, U.S. Patent No. 5,617,429.

4. STATUS OF AMENDMENTS

No amendments were filed or entered subsequent to the Office Action of January 25, 2008.

5. SUMMARY OF THE CLAIMED SUBJECT MATTER

The invention as claimed is summarized below with reference numerals and references to the specification and drawings. The invention is broadly set forth in the language corresponding to independent claims 1, 4 and 22 and dependent claims 3 and 6-21. Discussions about elements of the invention can be found at least in the locations in the specification and drawings cited in the claims below.

1. A computer implemented method of verifying events [page 4, line 12 - page 6, line 2] generated by an agent (12) [FIG. 1; page 6, lines 25-28; page 9, line 21 - page 10, line 32], said method comprising:

detecting (50) [FIG. 2; page 20, lines 4-8] an input signal (e.g., 20) at an input of said agent;

generating (52) [page 20, lines 8-12] an expected output signal based at least in part on said input signal;

detecting (54, 90) [FIGS. 2, 4; page 20, lines 12-15; page 22, line 25-31] an output signal (e.g., 22, 30, 32) at an output of said agent, wherein said output signal is a translation of said input signal generated by said agent;

comparing (56, 96) [page 20, lines 13-16; page 22, line 26 - page 23, line 1] said output signal with said expected output signal to verify whether said agent produced said output signal correctly based on said input signal; and

signaling (60, 100) [page 20, lines 15-23; page 22, line 26 - page 23, line 3] an error if said agent did not produce said output signal correctly.

3. The method of claim 1, further comprising signaling (66, 94) an error if (64, 92) [page 20, lines 15-23; page 22, line 26 - page 23, line 3] said output signal has no corresponding

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expected output signal.

4.   An apparatus for producing expectations to verify
events [page 4, line 12 - page 6, line 2] generated by an
agent (12) [FIG. 1; page 6, lines 25-28; page 9, line 21 -
page 10, line 32]; comprising:

     a.   at least one computer readable medium; and

     b.   computer readable program code stored on said at
least one computer readable medium, said computer
readable program code comprising:

          i.   program code for monitoring (50) [FIG. 2; page
20, lines 4-8] at least one input (e.g., 20) of
said agent for a stimulus;

          ii.   program code for generating (52) [page 20,
lines 8-12] an expectation of an event based at
least in part on said input, wherein said event
is expected to be generated by said agent as a
result of said stimulus;

          iii. program code for monitoring (54, 90) [FIGS. 2,
4; page 20, lines 12-15; page 22, line 25-31]
at least one output of said agent for said
event (e.g., 22, 30, 32); and

          iv.   program code for signaling an error if said
event is not detected at said at least one
output [e.g., see page 11, lines 26-32].

6.   The apparatus of claim 4, further comprising program code
for signaling (66, 94) an error if (64, 92) [page 20, lines
15-23; page 22, line 26 - page 23, line 3] said event is
detected at said at least one output for which no expectation
has been produced.

8.   The apparatus of claim 4, wherein said program code for

monitoring said at least one input of said agent for said
stimulus comprises program code for identifying said stimulus
using correlative information in said stimulus [page 21, line
32 - page 22, line 1; page 28, lines 7-13].

5   9.   The apparatus of claim 8, wherein said correlative
information comprises a transaction identification [page 21,
line 32 - page 22, line 1].

10. The apparatus of claim 8, wherein said correlative
information comprises an address of memory being accessed by
10   said stimulus and an identity of a source of said stimulus
[page 21, line 32 - page 22, line 1].

11. The apparatus of claim 4, wherein said program code for
monitoring said at least one input of said agent for said
stimulus comprises program code for gathering said stimulus
15   from a plurality of separately transmitted portions [page 21,
line 32 - page 22, line 1; page 28, lines 7-13].

12. The apparatus of claim 11, wherein said program code for
gathering said stimulus from said plurality of separately
transmitted portions comprises program code for establishing a
20   watch list, said watch list containing an entry for each
stimulus for which said separately transmitted portions are
being awaited, and wherein said program code for monitoring
said at least one input of said agent for said stimulus
comprises:
25   program code for detecting one of said separately
       transmitted portions at said at least one input;
              program code for searching said watch list for said
       stimulus for which said one of said separately
       transmitted portions was being awaited; and

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program code for adding said one of said separately transmitted portions to said stimulus [FIG. 7, page 28, line 17 - page 30, line 9].

13.   The apparatus of claim 4, wherein said program code for producing said expectation of said event comprises program code for creating a transaction record to contain information relating to a memory transaction involving said agent [page 4, lines 21-31; page 6, lines 2-22].

14.   The apparatus of claim 13, wherein said program code for producing said expectation of said event further comprises:
        program code for creating an expectation record to contain information relating to an expected event from said agent; and
        program code for associating said expectation record with said transaction record [page 4, lines 21-31; page 6, lines 2-22].

15.   The apparatus of claim 4, wherein said program code for producing said expectation of said event comprises program code for storing expected data associated with said expectation, said expected data being received in a plurality of separate incoming transmissions in said stimulus, said expected data being expected to be transmitted by said agent in a plurality of separate outgoing transmissions in said event [page 8, lines 15-21; page 15, lines 9-19; page 30, line 24 - page 31, line 3].

16.   The apparatus of claim 15, further comprising:
        program code for comparing (92, 102) said expected data with actual data in said event;
        program code for signaling (104) an error if said

expected data does not match said actual data; and

program code for signaling (94) [page 22, line 25 - page 23, line 8] an error if said actual data is not expected.

5   17. The apparatus of claim 15, further comprising program code for signaling (100) an error if any of said plurality of separate outgoing transmissions is detected before all of said plurality of separate incoming transmissions have been received [page 22, line 25 - page 23, line 3; page 24, lines 10   15-17].

18. The apparatus of claim 15, wherein said program code for monitoring said at least one output of said agent for said event begins monitoring said at least one output for said plurality of separate outgoing transmissions as soon as a 15   first of said plurality of separate incoming transmissions has been received [page 22, lines 2-17; page 24, lines 28-31].

19. The apparatus of claim 18, wherein said program code for storing said expected data comprises identifying said first of said plurality of separate incoming transmissions using 20   correlative information in said first of said plurality of separate incoming transmissions and further comprising identifying subsequent transmissions of said plurality of separate incoming transmissions by their being contiguously transmitted on a same input of said agent as said first [page 25   22, lines 2-17; page 24, line 28 - page 25, line 7].

20. The apparatus of claim 19, wherein said same input of said agent comprises a same physical and virtual input channel [page 24, line 28 - page 25, line 7].

21. The apparatus of claim 18, wherein said program code for storing said expected data comprises identifying each of said plurality of separate incoming transmissions using correlative information in said each of said plurality of separate

5   incoming transmissions to enable gathering and sorting of interleaved transmissions belonging to different stimuli [page 21, line 23 - page 22, line 1; page 27, line 31 - page 28, line 13].

22. An apparatus for testing an agent in a computer system,

10   comprising:

    means for detecting (50) [FIG. 2; page 20, lines 4-8] at least one incoming message as it is received by said agent;

    means for generating (52) [page 20, lines 8-12] at

15   least one expected outgoing message that should be produced by said agent in response to said incoming message, wherein said at least one expected outgoing message is generated at least in part based on said at least one incoming message;

20   means for verifying (56, 96) [page 20, lines 13-16; page 22, line 26 - page 23, line 1] whether said agent generates 90) [FIGS. 2, 4; page 20, lines 12-15; page 22, line 25-31] an outgoing message matching said expected outgoing message; and

25   means for signaling (60, 100) [page 20, lines 15-23; page 22, line 26 - page 23, line 3] an error if said agent does not generate an outgoing message matching said expected outgoing message.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Appellants appeal the rejection of claims 1-4 and 6-22 under 35 U.S.C. 102(b) as being anticipated by Goto, U.S. Patent No. 5,617,429.

7. ARGUMENT

I. Rejection of claims 1-4 and 6-22 under 35 U.S.C. §102(b)

CLAIM 1

Claim 1 is reprinted as follows for convenience:

"A computer implemented method of verifying events generated by an agent, said method comprising:
    detecting an input signal at an input of said agent;
    generating an expected output signal based at least in part on said input signal;
    detecting an output signal at an output of said agent, **wherein said output signal is a translation of said input signal generated by said agent**;
    comparing said output signal **with said expected output signal** to verify whether said agent produced said output signal correctly based on said input signal; and
    signaling an error if said agent did not produce said output signal correctly."

At least the above highlighted features are not anticipated or suggested by the cited references and would not have been obvious to a person with ordinary skill in the art having the cited references. Goto discloses a failure

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detection system that tests integrated circuits. (Col. 1,
lines 9-11) Goto's integrated circuits under test are located
in a device 101 that also includes a failure detection circuit
101b. (FIG. 1 and col. 11, lines 25-28) Goto discloses a CPU

5   103 that performs read/write and self-test control operations
on busses 104, 105 and 106 connected to the device 101, and
the failure detection circuit 101b conducts a self-test to
check for errors during these control operations. (Col. 11,
lines 28-35) Goto describes the operation of the system in

10   col. 12 wherein a random logic unit 2 is tested. (Col. 12,
lines 14-21) The CPU 103 writes an input pattern to be tested
and an expected pattern corresponding to the input pattern to
the failure detection circuit 101b, where they are stored in
an input pattern storage 45 and an expected pattern storage

15   52, respectively. (Col. 12, lines 25-30) The CPU 103 then
initiates a self-test mode. (Col. 12, lines 30-32) When the
input pattern is again received at the input of the random
logic unit 2, the input is compared with the input patterns
stored in the input pattern storage 45, enabling the expected

20   pattern corresponding with the input pattern to be retrieved
from the expected pattern storage 52. (Col. 12, lines 33-58)
The output signal from the random logic unit 2 is then
compared with the expected pattern from the expected pattern
storage 52. (Col. 12, lines 62-66)

25   In contrast, Appellant's claimed invention does not
require generation of inputs and expected outputs before a
test begins. The core of Goto's system is a conventional
system of test vectors and expected results that are generated
in advance. Appellant's claimed invention may be used in

30   other types of testing such as architectural verification in
which a software simulation of an architecture for a hardware
device and actual hardware having that architecture both
receive the same inputs and their outputs are compared to

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verify that the hardware implementation of the architecture is correct. (See specification, page 5, line 31 - page 6, line 2) In this case, the software architecture simulation would generate an expected output signal based on an input signal

5   detected at an input to the hardware device, and the actual output signal from the hardware device would be compared with the expected output signal generated by the software architectural simulation. This type of testing may be performed during normal evaluative operation of a system,

10   without the need to generate test vectors and corresponding correct outputs in advance as in Goto's system.

It is important to note that Goto's CPU 103 provides **both** an input pattern and an expected pattern (in essence an expected output pattern) before the failure detection device

15   101b is placed in a self-test mode. (See col. 12, lines 25-32) Thus, Goto's expected pattern is not generated "based at least in part" on the input signal that is detected at an input of the agent, as in Appellants' claim 1. Goto's expected pattern is generated before an input is even provided

20   to the device 101.

The Examiner appears to have equated both the "expected output signal" and the "output signal" of Appellants' claim 1 with the output of Goto's random logic unit 2. (see paragraph 6, page 3 and the discussion of claim 1 on page 4 of the

25   Office Action mailed January 25, 2008) Appellants' believe this interpretation is erroneous because these are two different signals that are compared in claim 1. An alternative interpretation would be that Goto's expected pattern from the expected pattern storage 52 corresponds with

30   the expected output signal of claim 1 and that Goto's output signal from the random logic unit 2 corresponds with the output signal of claim 1. However, as discussed above, this interpretation also does not anticipate every element of claim

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1 because Goto's expected pattern is not generated based at least in part on the input signal detected at an input of the agent. Again, Goto's expected pattern is stored in the expected pattern storage 52 by the CPU 103 at the same time the input pattern is stored in the input pattern storage 45 by the CPU 103 (see col. 12 lines 25-32), both before the CPU 103 places the failure detection circuit 101b in self-test mode (see col. 12, lines 30-32). It is evident that Goto's expected pattern is not generated based at least in part on the input signal that is detected at the input of the agent under test as in claim 1. Rather, the expected output pattern is generated in advance and is provided by the CPU 103 at the same time the input pattern is provided by the CPU 103 to the failure detection circuit 101b, before the failure detection circuit 101b is placed in self-test mode (see col. 12, lines 30-32).

Appellants therefore believe that claim 1 is allowable over the cited references and respectfully request reversal of the rejection.

CLAIM 2

Solely for the purposes of this appeal, claim 2 stands or falls with claim 1.

CLAIM 3

Claim 3 is reprinted as follows for convenience:

"The method of claim 1, **further comprising signaling an error if said output signal has no corresponding expected output signal.**"

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   At least the above highlighted features are not
anticipated or suggested by the cited references and would not
have been obvious to a person with ordinary skill in the art
having the cited references. The Examiner has referred to
Goto col. 12, lines 63-67 and col. 13, lines 1-3, in which a
comparison result indicates whether the expected pattern
agrees with the output of Goto's random logic unit 2.
Appellants' note that this does not signal an error if there
is no "corresponding expected output signal". Goto seems to
always generate an output and that output is tested to see if
it matches the expected pattern. Goto does not detect and
signal the absence of an output signal that is expected.

CLAIM 4

   Claim 4 is reprinted as follows for convenience:

      "An apparatus for producing expectations to
   verify events generated by an agent; comprising:
   a. at least one computer readable medium; and
   b. computer readable program code stored on said at
   least one computer readable medium, said computer
   readable program code comprising:
         i.   program code for monitoring at least one input
              of said agent for a stimulus;
         ii. **program code for generating an expectation of
              an event based at least in part on said input,
              wherein said event is expected to be generated
              by said agent as a result of said stimulus;**
         iii. program code for monitoring at least one output
              of said agent for said event; and
         iv. **program code for signaling an error if said
              event is not detected at said at least one**

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output."

At least the above highlighted features are not anticipated or suggested by the cited references and would not have been obvious to a person with ordinary skill in the art having the cited references. The arguments for allowability set forth above with respect to claims 1 and 3 are repeated, but specifically directed to the apparatus of claim 4. Again, Goto does not disclose or suggest generating an expectation of an event based at least in part on the input to an agent. Furthermore, Goto does not generate an expectation for an event and signal an error if the event is not detected. Goto only checks to see if outputs match presupplied expected patterns, and does not verify that outputs are generated when they should be and that no unanticipated outputs are generated.

CLAIM 6

Claim 6 is reprinted as follows for convenience:

"The apparatus of claim 4, further comprising **program code for signaling an error if said event is detected at said at least one output for which no expectation has been produced.**"

Goto does not signal an error if an event is detected for which no expectation has been produced. Goto only checks to see if outputs match presupplied expected patterns, and does not verify that outputs are generated when they should be and that no unanticipated outputs are generated.

CLAIM 7

Solely for the purposes of this appeal, claim 7 stands or falls with claim 4.

CLAIM 8

5   Claim 8 is reprinted as follows for convenience:

"The apparatus of claim 4, wherein said program code for monitoring said at least one input of said agent for said stimulus comprises **program code for identifying said stimulus using correlative**
10   **information in said stimulus.**"

Goto does not discuss how a stimulus at an input to an agent is identified other than to say that inputs are compared with patterns one by one to find one that is "in agreement". (Col. 12, lines 34-42) Appellants therefore respectfully
15   disagree that Goto discloses or suggests the use of correlative information in a stimulus to identify the stimulus. Goto does not identify a stimulus, other than to match a stored input with the received input to obtain an address for a corresponding stored expected pattern. (See
20   col. 12, lines 33-58)

CLAIM 9

Claim 9 is reprinted as follows for convenience:

"The apparatus of claim 8, **wherein said correlative information comprises a transaction**
25   **identification.**"

Goto does not disclose or suggest correlative information in a stimulus comprising a transaction identification. The Examiner has referred to Goto col. 14, lines 1-7, which discuss an address decoder used to decode an address to select

5   an input pattern stored in an input pattern storage. Appellants respectfully disagree that an address used to retrieve data from a storage device comprises a transaction identification, and particularly a transaction identification in a stimulus detected at an input to an agent.

10   CLAIM 10

Claim 10 is reprinted as follows for convenience:

"The apparatus of claim 8, **wherein said
correlative information comprises an address of
memory being accessed by said stimulus and an**

15   **identity of a source of said stimulus.**"

Although Goto does disclose using an address to retrieve a stored input pattern (col. 14, lines 20-24), Goto does not disclose or suggest that the address is correlative information in a stimulus detected at the input of an agent.

20   Goto's address is not detected at the input of an agent, but appears to be generated internally in the failure detection circuit 101b when comparing the input detected at the input to the random logic unit 2 with the stored input patterns in the input pattern storage 45. (See col. 12, lines 33-43) In

25   other words, Goto does not disclose or suggest that signals detected at the input to the random logic unit 2 have an address that is used as correlative information to identify the stimulus. Rather, Goto identifies the signal detected at the input to the random logic unit 2 by comparing the input

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pattern to each stored input pattern until a match is found. Furthermore, Goto does not disclose or suggest that the identity of a source of said stimulus is used as correlative information to identify the stimulus. It appears that Goto's CPU 103 is the only source of data to the random logic unit 2. The identity of the CPU 103 is clearly not included in signals to the random logic unit 2 and used to identify the stimulus.

CLAIM 11

Claim 11 is reprinted as follows for convenience:

"The apparatus of claim 4, wherein said program code for monitoring said at least one input of said agent for said stimulus comprises **program code for gathering said stimulus from a plurality of separately transmitted portions.**"

Goto does not disclose or suggest gathering a stimulus at the input of an agent from a plurality of separately transmitted portions. Goto does disclose a set of input pattern registers to store an input pattern. (Col. 14, lines 8-9) However, the input pattern from the set of input pattern registers is not detected at the input of an agent, it would be stored in the registers after being sent (apparently as a single unit) from the CPU 103 to the failure detection circuit 101b before the device 101 is placed in self-test mode. Thus, Goto does not disclose that a stimulus is found at the input of an agent in a plurality of separately transmitted portions that may be gathered.

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CLAIM 12

Claim 12 is reprinted as follows for convenience:

"The apparatus of claim 11, wherein said
**program code for gathering said stimulus from said
plurality of separately transmitted portions
comprises program code for establishing a watch
list, said watch list containing an entry for each
stimulus for which said separately transmitted
portions are being awaited,** and wherein said program
code for monitoring said at least one input of said
agent for said stimulus comprises:
   **program code for detecting one of said separately
transmitted portions at said at least one input;
   program code for searching said watch list for said
stimulus for which said one of said separately
transmitted portions was being awaited; and
   program code for adding said one of said separately
transmitted portions to said stimulus.**"

By citing Goto col. 14, lines 20-40, the Examiner seems
to equate the claimed watch list containing a list of each
stimulus for which said separately transmitted portions are
being awaited with the independent input patterns stored in
Goto's input pattern storage 45. In one broad reading of the
term "watch list", Goto's input pattern storage 45 could be
viewed as a list of inputs that are being watched for at the
input of the random logic unit 2. However, as discussed with
reference to Claim 11, Goto does not transmit inputs to the
random logic unit 2 in a plurality of separately transmitted
portions. Thus, Goto does not watch for portions of stimuli
using a watch list. Even if Goto's input pattern storage 45

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were referred to as a watch list, it is not a watch list as defined in claim 12, wherein the watch list contains a list of each stimulus **for which said separately transmitted portions are being awaited.**

5   CLAIM 13

Claim 13 is reprinted as follows for convenience:

"The apparatus of claim 4, wherein said program code for producing said expectation of said event

10   comprises **program code for creating a transaction record to contain information relating to a memory transaction involving said agent.**"

As discussed above, Goto stores input patterns and expected patterns that are the expected outputs from a random

15   logic unit 2. Goto does not disclose or suggest creating a transaction record relating to a memory transaction involving an agent. The Examiner has cited Goto col. 15, lines 35-50 which is directed at internal elements of an error processing circuit 7:

20   "The result outputted from the error processing circuit 7
is inputted to the error register 8. In the error
register 8, the error flag, the pattern number and the
block number are written into the error flag field 8a,
the pattern number field 8b and the block number field

25   8c, respectively. Since there are a plurality of
functional blocks, the error registers 8 comprises a
plurality of groups of the error flag fields 8a, the
pattern number fields 8b and block number fields 8c.

The data from a plurality of error flag fields 8a are

30   inputted to an OR gate L14, and the logical sum thereof
is outputted to a register 77. The register 77 stores
data concerning an interrupt signal INT. When any of the

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error flag fields 8a has an error flag which is set on, a
notification that the error occurs is delivered through
the OR gate L14 and then the register 77 outputs the
interrupt signal INT. "

5 This does not disclose an agent under test, nor a
transaction record containing information relating to a memory
transaction involving the agent.

CLAIM 14

Claim 14 is reprinted as follows for convenience:

10 "The apparatus of claim 13, wherein said
**program code for producing said expectation of said
event** further comprises:
**program code for creating an expectation record to
contain information relating to an expected event from**
15 **said agent;** and
**program code for associating said expectation record
with said transaction record.**"

As discussed above, Goto's CPU 103 supplies input
patterns and expected patterns, and does not discuss how those
20 patterns are produced. Goto col. 15, lines 44-65 have been
cited as anticipating claim 14:

"The data from a plurality of error flag fields 8a are
inputted to an OR gate L14, and the logical sum thereof
is outputted to a register 77. The register 77 stores
25 data concerning an interrupt signal INT. When any of the
error flag fields 8a has an error flag which is set on, a
notification that the error occurs is delivered through
the OR gate L14 and then the register 77 outputs the
interrupt signal INT.

30 Thus, the CPU 103 of FIG. 1 monitors the error register 8
at any time. Or, when the occurrence of error is notified

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by the interrupt signal INT which is provided so as to give a notification of the occurrence of error to the outside, it is found which functional block and which pattern stored in the input pattern storage 45 concern the error by studying the content of the error register 8. Therefore, it is possible to obtain the information regarding the error on each occasion and the possibility of the occurrence of error by input pattern. Moreover, even a hard ware having a small number of test circuits can achieve efficient and dynamic failure detection of high detection ratio by reprogramming of the failure detection circuit 101a so that a self-test may be conducted preferentially for input patterns with high possibility of error."

This does not disclose program code for creating an expectation record. Again, an expectation record contains information about an event that is expected at the output of an agent under test as a result of an input stimulus. Goto's expected pattern storage 52 contains expected patterns to be generated by a random logic unit 2, although Goto's expected patterns are not treated as expectations of events as in the claims. Goto does not watch the output to make sure that expected patterns are produced by the random logic unit 2. Goto's expected patterns should only appear when a corresponding input pattern is first seen at the input of the random logic unit 2. Thus, detecting all of Goto's expected patterns are actually detected at the output would be a problem if all the corresponding input patterns were not first seen. Goto does not disclose a method of detecting this problem as do Appellants, but this points out the fact that Goto's expected pattern storage is not equivalent with the claimed expectation records.

CLAIM 15

Claim 15 is reprinted as follows for convenience:

"The apparatus of claim 4, wherein said program

code for producing said expectation of said event comprises **program code for storing expected data associated with said expectation, said expected data being received in a plurality of separate incoming transmissions in said stimulus, said expected data being expected to be transmitted by said agent in a plurality of separate outgoing transmissions in said event.**"

Goto, col. 14, lines 8-20 has been cited as anticipating claim 15:

"Reference numeral 60 denotes a set of input pattern storing registers for storing an input pattern. The input pattern storage 45 comprises a plurality of sets of input pattern storing registers 60. In each address 64 to 66, a set of input patten [sic] storing registers 60 are disposed, being connected to an output bus 61 and a bus 58 which is connected to the data bus 34. When the enable signal inputted to the address decoder 44a is in an enable state, one of the addresses 64 to 66 each having a set of input pattern storing registers 60 is selected. The data inputted to the data bus 34 are transmitted through the bus 58 to be written into the input pattern storing registers 60 having the selected address."

Appellants respectfully disagree that this discloses the elements of claim 15, including, for example, that an agent under test receives data in a plurality of separate incoming transmissions and that it is expected that the agent will then transmit the data in a plurality of separate outgoing transmissions. Goto also does not disclose program code for storing the data expected to be transmitted. Although Goto discloses storing an input pattern in a set of input pattern storing registers, Goto does not disclose or suggest that the input pattern is received or transmitted by the random logic unit 2 in a plurality of transmissions.

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CLAIM 16

Claim 16 is reprinted as follows for convenience:

"The apparatus of claim 15, further comprising:
program code for comparing said expected data with
actual data in said event;
program code for signaling an error if said expected
data does not match said actual data; and
**program code for signaling an error if said actual
data is not expected.**"

Goto compares an output pattern with an expected pattern
and indicates an error if they do not match. However, Goto
does not disclose or suggest signaling an error if an output
is detected that was not expected.

CLAIM 17

Claim 17 is reprinted as follows for convenience:

"The apparatus of claim 15, further comprising
**program code for signaling an error if any of said
plurality of separate outgoing transmissions is
detected before all of said plurality of separate
incoming transmissions have been received.**"

Goto, cols. 26-35 has been cited. This is evidently an
inadvertent error, as Goto has only 26 columns. However, no
disclosure or suggestion has been found in Goto for the
claimed limitations of claim 17.

CLAIM 18

Claim 18 is reprinted as follows for convenience:

"The apparatus of claim 15, **wherein said
program code for monitoring said at least one output
of said agent for said event begins monitoring said
at least one output for said plurality of separate
outgoing transmissions as soon as a first of said
plurality of separate incoming transmissions has
been received.**"

As discussed above, Goto does not disclose or suggest
that input patterns or outputs from the random logic unit 2
are transmitted in a plurality of separate transmissions.
Goto therefore also does not disclose or suggest program code
that begins monitoring the output for outgoing transmissions
as soon as the first of a corresponding plurality of separate
incoming transmissions has been received.

CLAIM 19

Claim 19 is reprinted as follows for convenience:

"The apparatus of claim 18, wherein said
program code for storing said expected data
comprises **identifying said first of said plurality
of separate incoming transmissions using correlative
information in said first of said plurality of
separate incoming transmissions and further
comprising identifying subsequent transmissions of
said plurality of separate incoming transmissions by
their being contiguously transmitted on a same input**

of said agent as said first."

As discussed above, Goto does not disclose or suggest that input patterns or outputs from the random logic unit 2 are transmitted in a plurality of separate transmissions. Goto therefore also does not disclose or suggest identifying a first of a plurality of separate incoming transmissions using contained correlative information and identifying subsequent transmissions of the plurality of separate incoming transmissions by their being contiguously transmitted on a same input.

CLAIM 20

Claim 20 is reprinted as follows for convenience:

"The apparatus of claim 19, **wherein said same input of said agent comprises a same physical and virtual input channel.**"

The Examiner has cited Goto col. 17, lines 10-20 as disclosing the limitations of claim 20:

"A failure detection system in accordance with the third preferred embodiment will be described referring FIG. 10. In the test comparison ROM 4 of the second preferred embodiment, there may be a case where the processed results of the random logic unit 2 in response to some data prepared for the self-test or some input data have the same value. In other words, there may be a plural-to-one correspondence of the input pattern and the expected pattern responsive thereto. In this case, a plurality of expected patterns of the same value in the test comparison ROM 4 can be cut all but one. Reduction in the amount of data can be thereby achieved."

Clearly, this has nothing to do with the input of an agent under test comprising both a same physical and virtual

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input channel. Appellants respectfully disagree that Goto
discloses or suggests virtual input channels, or that in one
embodiment a same physical and virtual input channel is used.

CLAIM 21

Claim 21 is reprinted as follows for convenience:

"The apparatus of claim 18, wherein said
program code for storing said expected data
comprises **identifying each of said plurality of
separate incoming transmissions using correlative
information in said each of said plurality of
separate incoming transmissions to enable gathering
and sorting of interleaved transmissions belonging
to different stimuli.**"

Goto does not disclose or suggest inputs being
transmitted in a plurality of transmissions, nor that multiple
inputs may be interleaved, nor that program code is used to
gather and sort the interleaved transmissions. The Examiner
cites various portions of Goto that discuss comparing an input
pattern one by one with stored expected patterns, and storing
an input pattern in input pattern registers. Neither of these
teachings is related to interleaving separately transmitted
portions of different stimuli.

CLAIM 22

Claim 22 is reprinted as follows for convenience:

"An apparatus for testing an agent in a
computer system, comprising:
        means for detecting at least one incoming message as

it is received by said agent;

means for generating at least one expected outgoing message that should be produced by said agent in response to said incoming message, wherein said at least one expected outgoing message is generated at least in part based on said at least one incoming message;

means for verifying whether said agent generates an outgoing message matching said expected outgoing message; and

means for signaling an error if said agent does not generate an outgoing message matching said expected outgoing message."

At least the above highlighted features are not anticipated or suggested by the cited references and would not have been obvious to a person with ordinary skill in the art having the cited references. The arguments for allowability set forth above with respect to claim 1 is repeated, but specifically directed to the apparatus of claim 22. Again, Goto does not disclose or suggest generating an expectation of an event based at least in part on the input to an agent.

In view of the above, all of the claims are believed to be in condition for allowance, and the Appellants respectfully request reversal of the rejection.

Respectfully submitted,
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Claims Appendix

1.   (Previously presented) A computer implemented method of
verifying events
generated by an agent, said method comprising:
5   detecting an input signal at an input of said agent;
        generating an expected output signal based at least in
part on said input signal;
        detecting an output signal at an output of said agent,
wherein said output signal is a translation of said input
10   signal generated by said agent;
        comparing said output signal with said expected output
signal to verify whether said agent produced said output
signal correctly based on said input signal; and
        signaling an error if said agent did not produce said
15   output signal correctly.

2.   (Original) The method of claim 1, further comprising
signaling an error if said output signal does not correctly
match said expected output signal.

3.   (Original) The method of claim 1, further comprising
20   signaling an error if said output signal has no corresponding
expected output signal.

4.   (Previously presented) An apparatus for producing
expectations to verify events generated by an agent;
comprising:
25   a. at least one computer readable medium; and
        b. computer readable program code stored on said at
            least one computer readable medium, said computer
            readable program code comprising:
                i.   program code for monitoring at least one input
30   of said agent for a stimulus;

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        ii.   program code for generating an expectation of an event based at least in part on said input, wherein said event is expected to be generated by said agent as a result of said stimulus;

        iii. program code for monitoring at least one output of said agent for said event; and

        iv.   program code for signaling an error if said event is not detected at said at least one output.

5.   (Cancelled)

6.   (Previously presented) The apparatus of claim 4, further comprising program code for signaling an error if said event is detected at said at least one output for which no expectation has been produced.

7.   (Original) The apparatus of claim 4, wherein said program code for monitoring said at least one input of said agent for said stimulus comprises program code for monitoring at least one input of a memory agent for said stimulus, said stimulus being selected from a group consisting of an initial request to perform a memory operation, a snoop response, and a read response.

8.   (Original) The apparatus of claim 4, wherein said program code for monitoring said at least one input of said agent for said stimulus comprises program code for identifying said stimulus using correlative information in said stimulus.

9.   (Original) The apparatus of claim 8, wherein said correlative information comprises a transaction identification.

10. (Original) The apparatus of claim 8, wherein said correlative information comprises an address of memory being accessed by said stimulus and an identity of a source of said stimulus.

11. (Original) The apparatus of claim 4, wherein said program code for monitoring said at least one input of said agent for said stimulus comprises program code for gathering said stimulus from a plurality of separately transmitted portions.

12. (Original) The apparatus of claim 11, wherein said program code for gathering said stimulus from said plurality of separately transmitted portions comprises program code for establishing a watch list, said watch list containing an entry for each stimulus for which said separately transmitted portions are being awaited, and wherein said program code for monitoring said at least one input of said agent for said stimulus comprises:

program code for detecting one of said separately transmitted portions at said at least one input;

program code for searching said watch list for said stimulus for which said one of said separately transmitted portions was being awaited; and

program code for adding said one of said separately transmitted portions to said stimulus.

13. (Original) The apparatus of claim 4, wherein said program code for producing said expectation of said event comprises program code for creating a transaction record to contain information relating to a memory transaction involving said agent.

14. (Original) The apparatus of claim 13, wherein said

program code for producing said expectation of said event
further comprises:

  program code for creating an expectation record to
contain information relating to an expected event from
5 said agent; and

  program code for associating said expectation record
with said transaction record.

15. (Original) The apparatus of claim 4, wherein said
program code for producing said expectation of said event
10 comprises program code for storing expected data associated
with said expectation, said expected data being received in a
plurality of separate incoming transmissions in said stimulus,
said expected data being expected to be transmitted by said
agent in a plurality of separate outgoing transmissions in
15 said event.

16. (Original) The apparatus of claim 15, further
comprising:

  program code for comparing said expected data with
actual data in said event;

20 program code for signaling an error if said expected
data does not match said actual data; and

  program code for signaling an error if said actual
data is not expected.

17. (Original) The apparatus of claim 15, further comprising
25 program code for signaling an error if any of said plurality
of separate outgoing transmissions is detected before all of
said plurality of separate incoming transmissions have been
received.

18. (Original) The apparatus of claim 15, wherein said
30 program code for monitoring said at least one output of said

agent for said event begins monitoring said at least one
output for said plurality of separate outgoing transmissions
as soon as a first of said plurality of separate incoming
transmissions has been received.

5   19.   (Original) The apparatus of claim 18, wherein said
program code for storing said expected data comprises
identifying said first of said plurality of separate incoming
transmissions using correlative information in said first of
said plurality of separate incoming transmissions and further
10   comprising identifying subsequent transmissions of said
plurality of separate incoming transmissions by their being
contiguously transmitted on a same input of said agent as said
first.

20.   (Original) The apparatus of claim 19, wherein said same
15   input of said agent comprises a same physical and virtual
input channel.

21.   (Original) The apparatus of claim 18, wherein said
program code for storing said expected data comprises
identifying each of said plurality of separate incoming
20   transmissions using correlative information in said each of
said plurality of separate incoming transmissions to enable
gathering and sorting of interleaved transmissions belonging
to different stimuli.

22.   (Previously presented) An apparatus for testing an agent
25   in a computer system, comprising:
        means for detecting at least one incoming message as
    it is received by said agent;
        means for generating at least one expected outgoing
    message that should be produced by said agent in response
30   to said incoming message, wherein said at least one

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expected outgoing message is generated at least in part based on said at least one incoming message;

means for verifying whether said agent generates an outgoing message matching said expected outgoing message; and

means for signaling an error if said agent does not generate an outgoing message matching said expected outgoing message.

<u>Evidence Appendix</u>

None.

<u>Related Proceedings Appendix</u>

None.